

## Reflections of a Pioneer, with Theo Colborn

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In the 1950s biologists began noticing unusual behavior and various reproductive health problems in wild animals. Environmental health analyst Theo Colborn was one of the first to start asking what those trends might mean for humans. In this podcast marking the 40th anniversary of Earth Day, Colborn discusses her research on the endocrine-disrupting effects of chemicals in the Great Lakes ecosystem—research that broke new ground in the field of environmental toxicology. Colborn, co-author of *Our Stolen Future*, now heads The Endocrine Disruption Exchange in Paonia, Colorado, and is a professor emeritus at the University of Florida in Gainesville.

**AHEARN:** It's *The Researcher's Perspective*. I'm Ashley Ahearn.

Today we mark the 40<sup>th</sup> anniversary of Earth Day by talking with a scientist whose study of the wildlife around the Great Lakes began a passionate—and sometimes controversial—journey toward understanding the chemicals known as endocrine disruptors.

Since the '50s biologists had been noticing some weird behavior in wild animals.

Gulls in Lake Ontario abandoning their nests. Alligators in a lake in Florida laying eggs that weren't hatching. In Southern California female western gulls were nesting with other females.

And then in the St. Lawrence River in Canada a *male* beluga whale washed up, and scientists, when they opened him up, were shocked to discover that he had a uterus and ovaries.

Environmental health analyst Theo Colborn was one of the first to connect the dots between the various reproductive health problems in wildlife—and then start asking the questions about what those trends might mean for humans.

In 1996, she co-authored the book *Our Stolen Future*, which laid out the concept of endocrine-disrupting chemicals and ignited a major movement in environmental health research.

Dr. Theo Colborn now heads The Endocrine Disruption Exchange in Paonia, Colorado, and she's professor emeritus at the University of Florida in Gainesville.

Dr. Colborn, thanks for joining me.

**COLBORN:** Oh it's great to be with you.

**AHEARN:** Let's start with endocrine disruptors. You refer to them as "hand-me-down poisons." What is that? What are they?

**COLBORN:** Well basically they are chemicals that have been around for quite a while, we just didn't know what they were doing. But they can be passed from the mother to her child when it is in the womb, and these can actually alter how the individual develops. Keep in mind that, you know, practically every day from the minute the sperm enters the egg something has to take place: cells begin to split, then actually cells begin to form a ball. The next thing you know, they're forming the tissue that's going to become the intestinal tract, the brains, the bones. It's all there, and if the chemical—one of these chemicals—gets into that chemical mix that's controlling how we are constructed, it can interfere with the construction of that system.

And the other thing is the damage may not be expressed until they reach adulthood so it's a very, very difficult situation in a human population to make a link between any particular chemical and any of these alterations that might have taken place in their body.

**AHEARN:** Now, when we say "endocrine-disrupting chemicals," what types of chemicals are we talking about specifically?

**COLBORN:** Well we're talking about chemicals that are— If you look around you where you're sitting right now you're probably in a studio; practically everything in here is made of plastic. They're in plastics. They're in our toys, the children's toys. If you go to your kitchen sink and under your bathroom sink and look at the cleaning compounds that are there, the cosmetics, the toiletries—they're just about in everything because they've made every one of these products much nicer; they last longer. They're preservatives. They're fire retardants.

**AHEARN:** So Dr. Colborn, when you were an environmental health analyst with the Conservation Foundation back in the late '80s, tell me what you were seeing and what kind of turned you on to the concept of reproductive health problems in the environment.

**COLBORN:** Basically I was working on an environmental health assessment of the Great Lakes requested by the International Joint Commission from Canada and the United States. They were very concerned because although they had cleaned up the lakes from physical chemical mess and debris along the shoreline and had stopped the fires in the rivers that were leading into the lakes, the animals around the Great Lakes were not thriving, and these animals were not able to reproduce. Some of the populations actually had been extirpated. But it was interesting, it was among the, among the egg-laying species—the birds, the fish, and the reptiles—where we found that if they were able to reproduce, the chicks in the eggs didn't hatch. Fish in the Great Lakes weren't reaching sexual maturity. I have pictures of female and male Coho salmon, and you can't tell them apart. The thyroid problem persisted. The thyroids actually were constructed differently, and they were functioning differently, although the animals seemed to be swimming and flying like they should. Behavioral changes in the animals: they did not take care of their offspring. Lack of parenting, female-female pairing, males flying off in fraternities and not protecting the nests. And it was sort of an endless list of the kinds of disorders that we were seeing in the animals. And in every one of the studies, practically, that were done, the concentrations of the organochlorine chemicals—now, these are persistent chemicals that build up in body fat, and remember these animals were all at the top of the food web,

just like we are—the chemicals in the water, from the Lake Superior to the bald eagle who came and sat on the tree on the shoreline, actually biomagnified 100 million times.

We began to realize that the toxicological testing that we had been doing to test these PCBs, the pesticides—the organochlorine pesticides—did not include looking at what took place in the womb, and it was very apparent that the female animals were transporting or sharing basically the chemicals in their bodies, dumping them into their eggs and right into that environment. And then the few mammal species we looked at, again, we found the same problem.

**AHEARN:** So tell me now, do you think that what you were seeing in animals, are we seeing similar results or similar effects in human beings?

**COLBORN:** Well, we're certainly seeing an epidemic of thyroid problems in the nation, but it's this growing list, and I'm going to start with the A's. You know we've got autism, which the link has definitely not been made yet, but it looks like they're closing in on that. But we've got ADHD. We have childhood cancers, early childhood diabetes, and then the adult onset of diabetes. Obesity problems. You've got endometriosis, where we begin to look at the reproductive tract where things don't develop normally. Early onset of testicular cancer in young men. Prostate and breast cancer in the aging community. Then there's Alzheimer's, Parkinson's. Many of these disorders now have been traced back to prenatal or very early postnatal exposure, while we're developing, when all that activity is going on, where all these vital systems that we depend upon for the rest of our life, that will basically help us function at those particular periods in our life as we mature, they're all being interfered with.

**AHEARN:** I'd like you to read a section of your book *Our Stolen Future* now. It's the part on page 238.

**COLBORN:** Well I do have to give credit to Diane Dumanovsky for this because Diane wrote every word in this book.

**AHEARN:** She's your co-author, right.

**COLBORN:** She was my co-author, yeah, that's right. She wrote:

"Some might find irony in the prospect that humans in their restless quest for dominance over nature may be inadvertently undermining their own ability to reproduce or to learn and think. They may see poetic justice in the possibility that we have become [unwitting] guinea pigs in our own vast experiment with synthetic chemicals. But in the end it is hard to regard such a chemical assault on our children and their potential for a full life as anything but profoundly sad. Chemicals that disrupt hormone messages have the power to rob us of rich possibilities that have been the legacy of our species and indeed, the essence of our humanity."

**AHEARN:** Some called *Our Stolen Future* the next generation of Rachel Carson's book *Silent Spring*. I'm wondering, could you tell me a little bit about how your findings, how this book on endocrine-disrupting chemicals was received when it came out?

**COLBURN:** Well it was interesting, I've always said that if Rachel Carson only had lived a few years more she would have discovered this then, and we wouldn't be in quite the predicament we're in today. We picked up some very, very elegant attacks. Very outright, straightforward, that this was pure junk science. I guess I didn't take any of it personally, and I didn't let it worry me, but that same kind of very sophisticated public relations effort is still going on today. The same scientists that were hired to debunk our book have been hired to debunk climate change. I see the names coming up all the time. So they don't have the battery of people behind them or scientists anymore, like we do for endocrine disruption. What's happened is the whole concept and all of the assumptions that come with looking at the endocrine system and how it functions has now been picked up by scientists around the world. And I'm not worried that this issue is going to get buried because of opposition or suppression, because you can't keep scientists from telling the truth and seeking the truth.

**AHEARN:** Dr. Colborn, thank you so much for joining me.

**COLBORN:** Oh Ashley, it was a pleasure to talk to you.

**AHEARN:** Dr. Theo Colborn is the founder and president of the nonprofit group The Endocrine Disruption Exchange and co-author of the book *Our Stolen Future*.

**AHEARN:** And that's *The Researcher's Perspective*. I'm Ashley Ahearn. Thanks for downloading!

**Ashley Ahearn**, host of *The Researcher's Perspective*, has been a producer and reporter for National Public Radio. She is an Annenberg Fellow at the University of Southern California specializing in science journalism.